Arbor and Wild Life Day Issue

BULLETIN TO THE SCHOOLS

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COVER PICTURE: Forest Sanctuary, Allegany State Park

Photograph by Charles E. Simmons
Buffalo Society of Natural Sciences

THE UNIVERSITY OF THE STATE OF NEW YORK
BULLETIN TO THE SCHOOLS

Issued monthly during the school year by the State Education Department

CHARLES F. PROBES, *Editor* MILDRED HAND, *Assistant*

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The University of the State of New York

Bulletin to the Schools

VOLUME 34 MARCH 1948 NUMBER 7

Bird, Arbor and Wild Life Days

More than three-quarters of a century ago, the idea of Arbor Day was born — "a day for the planting of trees and for conducting a program to inculcate a love for all living things."

Since that time, this annual celebration has become of ever-increasing significance in American folkways. Arbor Day is set aside to give us a better understanding of the forces of Nature, to instil an appreciation of our country and to emphasize the need for protection and conservation of the natural beauties and resources which are America.

This year when much of the world is hungry and in need, it is more important than ever that we stress these objectives of conservation, of planting gardens, of protecting our fields and forests, and of working with all the natural resources with which our country is so generously endowed. As Henry Cuyler Brunner has said:

"What does he plant who plants a tree?
He plants, in sap and leaf and wood,
His blessings on the neighborhood;
A nation's growth from sea to sea
Stirs in his heart who plants a tree."

By virtue of my office as Commissioner of Education, and in accordance with law, it is my duty and pleasure to designate April 16th as Bird Day, and April 23d, April 30th or May 7th, whichever best suits the convenience of each locality, as Arbor and Wild Life Day.

Francis T. Spaulding

Commissioner of Education

A Various Language

"To him, who, in the love of Nature, holds
Communion with her visible forms, she speaks
A various language." W. C. BRYANT

GERTRUDE G. WEBSTER
Teacher of English
School 63, Buffalo

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TEACHERS HAVE BEEN ever alert for improved methods to help them accomplish their task of preparing children for life. One method of applying instruction in English, together with having some fun, has been found in the organization of Junior Audubon Clubs.

Early in September the sixth, seventh and eighth grades at School 63 in Buffalo elect their officers for these clubs and begin a year of activities so diverse as to afford an interest to every child. Monthly club meetings, frequent field trips, contests featuring essays, posters, birdhouses and feeding stations, assembly programs — all show, in one way or another how satisfying can be their adventures with nature.

Of these, the monthly meeting is conducted as a part of the regular oral English. With officers presiding, every child gives the names of the different species of birds he has seen during the month, and a special committee presents the program for the day. Recent discussion of beneficial predators and the winter ducks in the Niagara river have awakened lively minds to the interdependence of all life. Equally important is the continuing development of esteem for such democratic principles as respect for the individual, acceptance of the majority's decision and assumption of responsibility. Some children, ordinarily shy during an oral English period, lose their self-consciousness in the excitement of recounting the antics of a chickadee or the capture of a mouse by a sparrow hawk. For the first time in their lives such retiring ones gain a new distinction in their classmates' eyes, with inestimable good results.

Although not every member can participate in them, it is the field trips that bring forth the most enthusiastic response. Because of the nearness of several ideal "birding" spots, an abandoned quarry, the University of Buffalo campus and a city golf course, the different seasons speak a "various language" to these youngsters interested in the out-of-doors. This quarry attracts red-winged blackbirds, yellowlegs and spotted sandpipers. Last fall a flock of 23 surprised blue-winged teal circled above the heads of 40 surprised hikers, and penetrating cries of "kill-dee, kill-dee" brought forth exclamations of delight in the precise wing pattern of our lovely shore bird.

During January 1948, several children reported a robin in the university area. After being photographed by a child's father and again by an eighth grade boy, this ornithological nonconformist induced 16 hardy watchers to brave the rigors of a cold afternoon with the hope of adding it to their year's list. Unsuccessful though they were, spirits remained high and soared higher when a mother who had seen this "wayward thrush," invited them all inside for a cup of hot chocolate!

It is this spirit of communion that is so gratifying. It is not unusual to find one of the older children on one of the walks towing along a younger member of his family. Happy the day when Dad or Mother is "teched." In May 1947 Lincoln Park, one of the last local strongholds to resist the onslaughts of civilization, was visited by a wondrous delegation. Woodcock perform their aerial courtship there, and with the echo of its Cornell recording fresh in their ears, 27 adults and children ventured forth to hear the real thing. With cars and bikes parked alongside the road, they awaited the serenade. As twilight deepened, the strange call began. Everyone strained his eyes for a sight of the plump body as he hurtled into space, to come winnowing back almost to the identical place of departure. The feathered courtier was discovered, and with the injunction, "Don't breathe!" the group split into nine's, and in turn, tiptoed closer for a better view.

This was the first time some of them had ever been witness to the mysterious phenomenon of migration. It brought a thrill to know that sights which the first settlers saw could still be theirs and, as surely as May comes, woodcock and bluebird and song sparrow will court in these well-loved haunts, during their lifetime, and long after. It is reassuring to feel there is never an end to this constant, yet ever-changing current of life. Whether consciously spoken or not, the truth of the Psalmist's praise takes on an intimate meaning, "The earth is the Lord's, and the fulness thereof; the world and they that dwell therein."

As further evidence of this "various language," contests have been held at school to encourage the classes to construct feeding stations and birdhouses. Both the mathematics and industrial arts

A Prize-winning Bird Feeding Station, with the Winner

teachers helped in the plans and execution of excellent models. These were later erected in the makers' backyards. Some were sold to members of the Buffalo Audubon Society, who attended the annual exhibits and recognized skilful workmanship!

The junior contests of the Conservation Forum of Buffalo and Western New York are bringing response from both the art and English classes. At its annual school, this civic organization awards prizes to those children whose posters, essays or projects effectively plead for a wiser use of our natural resources. For the 1948 contest, the sixth grade prepared compositions on "Birds in Winter," the two seventh grades on "Freedom Gardens" and "Beneficial Predators," while the eighth grades wrote of the imminence of a recurring dustbowl in

the western wheatlands. In the art department, posters will seek protection of such wildlife as flowers and the redhead duck and will advertise correct soil and forest practices. While it is pleasant to win a prize, the classroom instruction that preceded the contest brings the richest rewards. Made aware of the interdependence of soil, plants, water and animals, these young citizens in some not-too-distant day will guard those natural riches their forebears were so ruthless in destroying.

Assembly programs, too, have spoken a "various language." Illustrated with slides, picturescope, songs and dances, "Fun in Winter" told stories about the magic of a snowflake, frost patterns, trees in winter, forcing buds, heavenly friends and attracting birds. During the war another, "Outdoor Living," based on information in a Cornell bulletin, gave valuable instructions about camp sites, water, food, animals and harmful plants as well as fun to be found with footprints, sounds and birds. Our tin-can cooking utensils were exhibited at the Conservation Forum's annual school, and were later borrowed by one of the museum instructors who demonstrated preparation of outdoor meals in an evacuée course to leaders.

The question now is being asked, "How can an English teacher find time to include so much nature study in classwork?" The answer is, "I kill two birds (heaven forbid!) with one stone." Because they mean so much to my own enjoyment of life, I strive to instil in young hearts my love of nature and the English language. Can such a discourse as this be of help to others? As the crowded curriculums now stand, it will help very few. For a regular grade teacher to include in a typical day's lessons the added subject of conservation is to invite total physical collapse.

Yet the fact remains that whether or not time is allotted for instruction in conservation, all of us are paying attention to a need for it. Is there anyone in our State who, currently, has not decried the scarcity of fuel oil, gasoline or newsprint? Is there anyone who has not deplored the high cost of lobster, shrimp or salmon? Is there anyone who does not know that abundant supplies might still prevail, had selfishness and greed long ago been outlawed by a decent respect for our heritage?

How much longer will instruction in conservation to teachers and nature leaders be left to such an organization as the National Audubon Society? How much longer will wildlife sanctuaries and forest preserves be confined to the study and use of a few? Our present areas, estimable though they are, do not suffice and frequently are unknown to, or unvisited by, the very ones in whose hands lies the preservation or destruction of our State's riches.

Why should outmoded courses of study be considered adequate to our postwar needs? No one will deny that a knowledge of promissory notes is essential to an adult who wants to borrow money to build a house. But to a 13 or 14 year-old boy, planting trees on an eroded slope to guarantee lumber for that house is a far more vital lesson than the promissory note to illustrate the old truth that in this world there are no bargains and we always get what we pay for.

Because they reach more of the taxpayers, high schools, urban as well as rural, must be provided with nature sanctuaries *near at hand* where "tongues in trees, books in the running brooks" will bespeak practical truths not to be found in a Latin grammar. Any instructor in agriculture knows how difficult it is to convince a student of the advantages of contour plowing if his father

is a diehard up-and-down-hiller. With outdoor laboratories accessible to all communities, guided by experts in conservation practices, an educated young citizenry will build up our depleted state wealth.

New York State teachers, as well as the stylists, are ready for a "new look." Yet Bryant's old truths remain ever new:

"for his gayer hours
She has a voice of gladness, and a smile
And eloquence of beauty; and she glides
Into his darker musings with a mild
And gentle sympathy, that steals away
Their sharpness, ere he is aware."

For personal happiness together with effective instruction, I recommend communion with Nature's visible forms.

Audio-Visual Teaching of Nature

GRACE FISHER RAMSEY
Curator of School Relations
The American Museum of Natural History

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Nature comes into the classroom

BY AUDIO-VISUAL materials we mean all those materials that are brought into a lesson to aid in explaining, clarifying and meeting the purpose of the lesson. The list will include many things — blackboard and chalk, objects, specimens, flat pictures, charts and posters, photographs, sand, modeling clay, stereographs, lantern slides, filmstrips, motion picture films, recordings and any other materials that will assist in teaching a unit of work.

It must be remembered, however, that in themselves materials do not accomplish the task of teaching. It is only when the teacher uses them in the right way to convey the information needed at a particular time or to answer a question that has been raised in the class that they become real teaching aids.

It will also be seen that the teacher herself is the most important aid and guide. A teacher with a broad social consciousness and a good sense of humor to enhance her background of information and methodology can work wonders with the simplest of materials. Such a teacher will realize that no one type of material is the perfect type. Therefore, it is important for a teacher to know what all the possible aids are, their individual values and limitations, where each may be obtained and how to use each to satisfy the need.

In teaching lessons concerned with nature or natural science, the most important aid is the specimen in its own environment where it can be studied with its accompanying forms of life or inanimate objects about it. This provides the

advantage that is always gained by an ecological study of living forms. In many instances the object may be a bird or a small mammal in a tree, a shrub, or specimens easily found in a grass plot just outside of the schoolhouse door. Such study involves a field trip requiring no special preparation but one that will be very effective. It may be taken as an introduction to a new problem or during the study of a problem when the need arises to bring the pupils into contact with reality.

If the teacher has not had experience in conducting field trips with many children it will be better for her to commence with the school grounds, then later go to a near-by vacant lot, park or woodland area. Trees, shrubs, flowers, birds, frogs, insects and small mammals can be observed and studied in their natural environment, and specimens of leaves, flowers, seeds, certain insects and other materials collected and brought to the classroom for further study. Foreseeing the need for other visual materials to supplement the information already gained, the teacher will have provided in advance photographs, flat prints, lantern slides or a filmstrip — all substitutes for the real thing but very useful in supplying information that can not be gathered in the field at that time. The children will have secured enough experience with the real specimens to help them in understanding the pictures. Add to the above aids, if possible, a motion picture and have the pupils *interpret* what they see in the pictures by using some of their field trip experiences. Pertinent questions can be written on the board to stimulate careful observation and thought. Enthusiastic discussions which take place can be settled by continuous observation and further search in library books.

The specimens brought in from a field trip may well form the beginning of a small classroom nature museum. For such a project it is best to have a small number of specimens and not more than two of any one species. Also remember that their real value for a classroom museum lies in their teaching value and nothing else. A museum club with the teacher to guide the activity is an excellent way to start such a museum. To make it a valuable aid the specimens must be labeled carefully and all must be used in teaching.

Simple display technics improve the presentation and enhance the educational value of specimens in a classroom museum. A color scheme should be chosen that is appropriate to the subject matter, either harmonizing with the color of the specimens or similar to that found in the natural environment of the specimens. Supports, small pedestals or props should be used to point up the natural form of the specimens. The texture and color of

Courtesy of the American Museum of Natural History, New York

Young Beavers Feeding, near the Trailside Museum, Bear Mountain

these supports and of the background should be carefully considered. Often colored corrugated paper will prove an excellent medium with dried grasses, leaves, small twigs or branches, small rocks, sand, mosses or earth in the foreground to simulate the environment of the specimens. An interesting variety of surfaces can be secured through the use of corrugated boxes painted or covered with paper, and tin cans cut into interesting shapes and painted. Specimens should always be grouped to bring out relationships and each one arranged for the greatest visibility.

Courtesy of the American Museum of Natural History, New York

Boy Collectors, Trailside Museum, Bear Mountain

The planning and construction of these exhibits are excellent pupil activities. The materials and implements, such as paint and brushes, scissors, tape, hammer, nails, glue, used in their construction, are very simple. Pupils will prize much more highly the materials they are able to collect and display for themselves. There is much value in having a pupil search for certain things needed and use his own ingenuity in displaying them attractively. All exhibits in a classroom museum should stimulate curiosity and should be shared with the others through demonstrations.

The exhibits also provide considerable motivation for the continuation of a study of natural phenomena and living forms in nature. Through previous experience and careful preparation a teacher can foresee what questions may arise when beginning a new unit and can provide a few specimens to produce at the moment when the children's interest is aroused. Such specimens will prove a great economy in the time required to teach the unit, will provide real learning experiences and will stimulate the pupils to search for additional materials to supplement those the teacher provides.

One successful device is to have a committee place in a prominent position each week a single specimen for observation, identification and study, with reports to be given at the end of the week on all possible findings including such additional visual materials as pictures, charts, plaster casts.

Simple classroom museums are important for they capitalize on the universal interest of collecting materials. They encourage careful observation and develop an appreciation of artistic display technics which may easily be carried over into the pupils' own homes. New ideas about the collecting may be worked out so that the children will keep their museum constantly growing and changing according to the season of the year and their own interests. The pupils will work out problems which their newest acquisition may suggest, such as making a small terrarium for turtles collected near-by and then a filmstrip on paper to be used, in an opaque projector or a set of hand-

made lantern slides showing interesting facts they have discovered about the animal's habits.

During the period of study and research about a particular specimen certain phases of its life history which are needed for a more complete understanding of the subject may be missing. These needs may well be met by using a motion picture film or a filmstrip. Suppose the specimen happens to be the larva of a monarch butterfly found feeding on a milkweed plant. It is obviously impossible to secure all phases in the life of this insect for the immediate needs, but in a beautiful color film such as that produced by Sinmel-Meservey entitled "The Monarch Butterfly" or a colored filmstrip of the same name produced by the American Museum of Natural History, the pupils will find the answers to their questions. Then, while the pupils' interest is keen and there is a need for the visual aid to answer definite questions, is the time for its use.

The integration of audio-visual materials in a special instance was well illustrated a short time ago by a class in a school located in the southern Catskills. The special unit that the children were studying in their social studies was early colonial history. The teacher had heard of a beaver pond not far away and decided this was the time for a field trip to integrate nature study with history. On the way to the pond the children saw a song sparrow by its nest on the ground and took notes to use at a later time. At the edge of the pond they found two stumps of poplar trees cut down by beavers the previous autumn. Examining the stumps, the children saw the marks of the beavers' long incisor teeth and collected some of the chips for display in their classroom museum. With a small amount of plaster of Paris which the teacher had brought along — because she had visited this spot the previous day — a good cast was made of a beaver's footprint clearly discernible in the mud.

In the pond the children saw the round dome of a beaver lodge projecting above the level of the water. They secured some short branches near the lodge to show what part of a branch had served as winter food for the animals. They examined the dam constructed by the beavers that had resulted in forming the pond and they could also see a spot where the dam had been repaired after the force of high water had broken it down. Careful sketches were made of the pond, beaver lodge and dam to assist later in the construction of a simple diorama for their museum.

All their collected materials were carried back to their classroom for further study and careful arrangement in their small museum. This was only a three-foot by five-foot table and shelf placed in front of a window in one corner of their classroom, but it was always occupied with the children's exhibits having a timely interest.

Various committees then began working on problems of their own selection. One group started a search in the library to determine the historical importance of the beaver in colonial times and its present economic importance and to prepare visual representations of this. Another group studied the beaver's life history and habits to aid in constructing their small diorama showing the beaver pond, dam and lodge. Still another group searched for ways of showing the habits of the animal. A simple historical time chart was made and photographs were added to supplement the flat prints collected from the National Geographic and other magazines. A series of hand-made lantern slides about the beaver, including one showing in cross section the con-

struction of its lodge, was prepared by another group. During the study the teacher secured excellent supplementary audio-visual aids, consisting of two sound films, "Beavers" and "Common Animals of the Woods," both Encyclopaedia Britannica Films.

As a summary of this study invitations were sent to the parents of the children for "A Beaver Afternoon," presenting pupil demonstrations of their well-arranged materials, diorama and handmade slides and finally a showing of the sound films.

This is only one instance of a great many that could be cited to describe the methods used by teachers in nature education but it is one that illustrates a well-integrated program of audio-visual materials. In this study the two sound films were the only materials secured from an outside source. All the other aids were the results of the ingenuity and work of both teacher and pupils. Very often the simplest and most inexpensive materials prove to be the most effective of all audio-visual aids used in nature education.

Two Western New York Sanctuaries

HAROLD D. MITCHELL
Buffalo Ornithological Society

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Foresight and cooperation insure a sanctuary

AMONG THE MANY worth-while projects that man can promote to perpetuate our wild life and to preserve beautiful localities in all their natural grandeur is the formation of sanctuaries.

Great wealth is not required to accomplish this purpose, since a small sanctuary, well cared for, is better than a large neglected sanctuary. Small projects may therefore be initiated by a school or by a single individual, or larger projects by a society organized for such a purpose.

Such an idea was advanced by Professor William P. Alexander, and in 1934 the Nature Sanctuary Society of Western New York, Inc., was organized. Its charter members, about 100 in all, included many who had attended Professor Alexander's classes at the Buffalo Museum of Science. While the majority were interested in botany, others were interested in geology, entomology, herpetology, mammalogy and ornithology. A $5 initiation fee established a fund of $500, sufficient to purchase the first sanctuary property and to cover expenses incident to the proper legal transactions, surveying and posting of the property.

The first step taken by the new society was to acquire a 25-acre tract comprising a sphagnum bog, not far from Elon

Howard Eaton's old home in Springville, Erie county, New York, where many bog-loving plants are preserved. Other bog plants, which thrive in such an environment but which were not present when the property was purchased, were collected and planted in the bog in suitable places. Among these plants were Laborador tea, both black and red aronia, withe rod (*Viburnum cassinoides*), high bush blueberry, long-leaved sundew and bog club moss (*Lycopodium inundatum*).

Bird life was not neglected. A large feeding station was erected on a post near the northern edge of the bog. A trip is always made to the bog in late fall or early winter to fill this feeding station with many kinds of grain and seeds, and to place suet on near-by trees. Often many of our junior members, as well as members of the Audubon Society and of Junior Audubon Clubs, take part in these trips.

For many years a pair of marsh hawks have nested near the center of the bog. Black ducks' nests are occasionally found under the evergreens near its edge. In the white pine, hemlock and deciduous woods surrounding the bog we find great horned, barred and screech owls, ruffed grouse, scarlet tanager, magnolia, blackburnian and black-throated green warblers, red-eyed vireo, wood thrush, veery, chickadee and white-breasted nuthatch, to mention only a few of the birds nesting or observed there during the breeding season.

Photograph by James L. Blackmer

Natural Graft, East Concord Bog

This sanctuary, East Concord Bog, is known as the Houghton Preserve and the custodian is, very appropriately, Frederick Houghton himself, who is, by the way, author of an article entitled "Sanctuary for Wild Plants" which appeared in the March 1943 issue of BULLETIN TO THE SCHOOLS and which contained references to the plant life of the bog. Any person or group wishing to visit this sanctuary may do so by contacting Mr Houghton, who may be reached in Springville in summer and in Buffalo during the winter.

A few years after the bog was acquired, the Nature Sanctuary Society of Western New York purchased a second property, known as The William Prindle Alexander Preserve, located in the Zoar valley about halfway between the Springville and the Collins Center entrances to the valley. It consists of about 110 acres, partially surrounded by Cattaraugus creek, which borders it on the east, south and on the southwest, where it rises to a bluff high above the creek. On the summit of the

bluff is a fine stand of large sugar maples and hemlocks. Large second-growth beeches, maples and hemlocks with a sprinkling of white pines stand on the slopes toward the creek. On the more gentle slope to the road on the northwest is an old apple orchard, with many blackberry and raspberry bushes, and willows and poplars along Coon brook. Large sycamores and elms, along with aspens, maples and hemlocks grow on the alluvial flatland along the creek.

On a plateau above the northwest slope are hawthorns and thorn apples, and on this plateau and on the gentle northern slope, many plantings of trees and shrubs have been made. As it was the intention of the society to make this sanctuary as attractive as possible to birds, many of the plants were selected to provide their natural food. Thus coral berry, highbush cranberry, filbert, Asiatic chestnut, snowberry, white birch and aronias have already been planted, and other trees and shrubs providing food and cover and nesting sites for birds will be added later.

It was found that the old apple orchard and the thorn apple environment proved especially attractive to such birds as blue-winged, golden-winged and chestnut-sided warblers, chickadees and black-billed cuckoos. It may be of interest to list the breeding birds found when a survey of all singing males was made in both 1946 and 1947 on this 110-acre area. In the following compilation, " S " refers to a singing male, as presumptive evidence of its breeding, " N " — nest found, " E " —eggs, " Y " — young, " D " — drumming. Numbers refer to birds actually observed. (See page 180)

For the 1947 list I am indebted to A. C. Brettle, president of the Nature Sanctuary Society of Western New York.

The presence of so many crows noted in the breeding period was no doubt due to the presence of a great horned owl in the same woods, and probably no more than a third of these 15 crows nested on the tract.

Photograph by James L. Blackmer

East Concord Bog

The 1946 census was held on June 2d, but trips were made on earlier dates when nests of great horned owl, ovenbird, and field sparrow were found. The total was 52 breeding species, 233 individuals, an average of about 22 breeding birds to 10 acres of land area. A red-tailed hawk and a redwing flew over, but were not believed to nest in the area.

The 1947 census was held on June 1st, and showed a marked similarity to the results of the previous year. The total was 51 breeding species, 217 indi-

Breeding Birds, William Prindle Alexander Preserve

Species	*1946*	*1947*
Ruffed grouse	3 D	4, 1 D, N, 10 Y
Spotted sandpiper	...	1 S
Mourning dove	1 S	...
Yellow-billed cuckoo	3 S	2 S
Black-billed cuckoo	3 S, N, 2 Y	3 S
Great horned owl	3, N, 1 adult, 2 Y	1 S
Ruby-throated hummingbird	1	1
Belted kingfisher	...	1 S
Flicker	2 S, probable N	2 S
Pileated woodpecker	1 S, probable N	...
Hairy woodpecker	1	...
Downy woodpecker	1	...
Crested flycatcher	4 S	3 S
Phoebe	2 S	1 S
Least flycatcher	...	2
Wood pewee	5 S	5 S
Rough-winged swallow	2, N	...
Blue jay	3 S	1 S, N
Crow	5 S	15 S
Chickadee	11 S, 7 adult, 4 Y	5 S
White-breasted nuthatch	2 S	1 S
Red-breasted nuthatch	...	1 S
House wren	2 S, N 7E	2 S
Catbird	1 S	2 S
Robin	7 S	4 S, N 4Y, N 1E
Wood thrush	4 S, N 1E	5 S, N 1E
Veery	11 S, N 4E	8 S, N 3E, N 1E
Bluebird	...	1 S
Cedar waxwing	3 S	25 (flock)
Yellow-throated vireo	2 S	...
Blue-headed vireo	3, (2 S)	1 S
Red-eyed vireo	16 S	13 S
Black and white warbler	4 S	6 S
Golden-winged warbler	2 S	1 S
Blue-winged warbler	11 S	11 S
Nashville warbler	...	1 S, N 5E
Yellow warbler	1 S	1 S
Magnolia warbler	2 S	1 S
Black-throated blue warbler	2 S	...
Black-throated green warbler	9 S	7 S
Blackburnian warbler	6 S	4 S
Chestnut-sided warbler	7 S	8 S
Ovenbird	13 S, N 5E, N	11 S
Mourning warbler	1 S	3 S
Northern yellowthroat	1 S	3 S
Hooded warbler	6 S	2 S
Canada warbler	1 S	3 S
Redstart	9 S, N	5 S
Baltimore oriole	4 S	4 S
Cowbird	6 S	1 S
Scarlet tanager	6 S	6 S
Cardinal	...	1 S
Rose-breasted grosbeak	3 S, N 5E	3 S, N 3E

Species	*1946*	*1947*
Indigo bunting	8 S, N 3E	4 S
Goldfinch	4 S	1 S
Red-eyed towhee	3 S	3 S
Slate-colored junco	12 S	3 S
Field sparrow	5 S, N 4E, N 4Y	8 S, 2N 4E, N 3E, N 2E
Song sparrow	5 S	6 S

* * * * *

viduals (including a flock of 25 cedar waxwings, not yet nesting). We estimated about 19 birds to 10 acres of land area that year, three less than in 1946, possibly due to the very late and wet season. One of the interesting nests found was that of a ruffed grouse. Eight baby chicks left the nest when it was approached, and scattered in all directions, one coming to rest on the shoe of one of the observers. Two eggs remained in the nest, but when the nest was again visited about three hours later, only broken egg shells remained, and the brood, then probably ten in number, could not be located.

A first record of an actual nest of the Nashville warbler in Erie county was a rare find. This nest, containing five eggs, was carefully concealed in the grass at the foot of a weed stalk on the plateau mentioned earlier in this article. The previous year a singing male was heard and seen just west of the sanctuary area, so it is apparently a regular, though uncommon, breeding bird in the Zoar valley region. A yellow-bellied flycatcher was seen, but was believed to be a late migrant and not a breeding bird.

A similar series of breeding bird censuses will be held in future years on the same area, after the plantings have matured, and it will be interesting to observe what changes in the bird life of the area may take place due to the change in the environment thus brought about.

The custodian of this sanctuary is Alick Carter of Kenmore, a man who has published many articles on fossil fishes, and has described several new species that he has found in western New York quarries. Any individual or group wishing to visit the William Prindle Alexander Preserve and follow its nature trails should contact Mr Carter.

We hope ultimately to have labels placed along the trails to indicate the

Photograph by James L. Blackmer

Feeding Station, East Concord Bog

Photograph by James L. Blackmer

Sugar Maple, William Prindle Alexander Preserve

species of trees or plants of particular interest, and also a map with all such locations marked. A fernery has been established in an area along the eastern slope, and additional species will be added from time to time.

No sanctuary can be left entirely uncared for, as nature trails will soon become impassable, weeds will choke some of the plants we wish to preserve, poster signs must be renewed, birdhouses and feeding stations must be kept up. A cooperative effort of the membership provides the interest and labor for these necessary duties, and in such manner as to provide leisure for each to enjoy nature and to reap the reward which communion with the out-of-doors can bring to each of us.

Our experience in this fascinating field of conservation prompts a slogan: "A nature sanctuary for every community."

Bergen Swamp: A Nature Sanctuary

BABETTE I. BROWN
Biological Laboratories
University of Rochester

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A historic swamp becomes a sanctuary

SOME TWENTY MILES west of Rochester and about four miles northwest of the town of Bergen lies a swamp that has aroused the interest of botanists for well over a hundred years. George W. Clinton probably visited the area as early as 1826. Later, when he was president of the Buffalo Society of Sciences and Regent of The University of the State of New York, his annotated lists of plants appeared in the reports on the State Cabinet of Natural History. John A. Paine's Catalogue of the plants found in Oneida County and vicinity (1864) mentions certain species of plants from Bergen Swamp. In his study of

the flora of Buffalo and its vicinity David F. Day (1882) included plants from the swamp near Bergen.

Geologists believe that the 1500 acres that now comprise the swamp were once the bottom of a glacial lake. They lie over Salina shales which were covered with considerable till during the period of the great ice sheet. Certainly today Black creek, which arises to the south and flows north to join the Genesee river at Churchville, is an important factor in maintaining the swamp. The creek in its northward course is diverted naturally eastward and slowed down near Pumpkin hill; it then drops its load of soil, and along its banks builds up alluvial deposits as it flows along the northern border of the swamp. Underground springs to the south of the swamp area also aid in maintaining the swamp as they drain northward. Water from these springs is hard, and now and in the past lime-depositing Chara and various blue-green algae have been instrumental in building up large marl beds throughout the central portion of the swamp by bringing about the deposition of lime from this water.

Zoologists, too, have been interested in Bergen swamp. A trip there late in June or during July leaves no doubt as to the variety and abundance of insects. Many common amphibians are found in the swamp, bird lovers find it a veritable paradise, and the usual small mammals are present. Many of the paths through the swamp are trails made by deer and are more travelled by them than by human beings. If one visits the swamp alone and is a stealthy woodsman, he is likely to catch sight of foxes. But it is among the reptiles that Bergen swamp boasts its most unusual animals. Besides some eight common snakes one finds among the sphagnum hummocks in the marly areas the massasauga, or prairie rattlesnake, not common in New York State. The coal skink is another reptile not too frequently found in the State. Finally Muhlenberg's turtle completes the unusual reptile trio.

For many years now, conservationists have been interested in Bergen swamp. In 1925, Dr Homer D. House, State Botanist, emphasized the need for preserving this unique area. He had witnessed the destruction of once famous Lodi swamp near Syracuse by the forces of so-called civilization! In a Buffalo newspaper article for June 2, 1935, a great enthusiasm was expressed for the rare plants of Bergen swamp and the value and imperativeness of preserving the area. The first definite action in this direction, however, was taken by certain members of Rochester garden clubs and their friends when they met in November 1935 and established a committee to take

Photograph by Dr Henry Stachle

White Lady's-Slipper, Bergen Swamp

the necessary steps. The work of this committee culminated in the formation of the Bergen Swamp Preservation Society, incorporated under and chartered by the Board of Regents of New York State in 1936.

The aim of this society is to acquire and protect the swamp so that it can remain always as Nature created it. Under the protection of the society the area will continue in its primitive condition so that every living thing will be left alone, to the end that Nature's laws may work in their own way.

To date more than 300 acres of the desired land has been purchased by the society. Money for this purpose has been contributed by interested individuals through annual and life memberships in the society, by various garden clubs in the vicinity of Rochester which wish to support a conservation project and by other organizations, such as the Burroughs-Audubon Nature Club, which take excursions through the swamp.

Although the society has set up no special program for the study of the swamp, it has sponsored pilgrimages and encouraged field trips by any and all persons interested. By posted signs it has attempted to prevent the removal of the white lady's-slippers protected by law in the State. Recently the society has secured a series of colored slides of more than 50 different plants of the area; these are available for educational purposes. It has also contributed to the publication of The Vegetation of Bergen Swamp (I. The Vascular Plants) by W. C. Muenscher, professor of botany at Cornell University.

Last year through the initiative and effort of Mrs Wesley M. Angle, president of the trustees, the society received the

Photograph by Dr Henry Stachle

Cut-over Area of Cedar Swamp in Bergen Swamp; an Example of Damage to a Rare Wild Flower Environment

annual award of the Founder's Fund of the Garden Clubs of America. That money has already been used to buy additional acres of adjacent swampland.

Why have these conservation-minded people become interested to this extent in Bergen swamp? A series of trips there during the spring and summer would readily draw you, good reader, to the cause — for, if you have once seen the white lady's-slippers dotting the grayish marl floor on one of the " islet " openings within a dense wall of arborvitae at Bergen swamp in June, the intense glistening white of their pouchy corollas contrasting with the dark green of the creeping juniper trailing over the marl floor, you would possess with the poet a picture

" to flash upon that inward eye
Which is the bliss of solitude; "

and, though the flowers in question were not daffodils, yet upon recollection your heart with pleasure would fill!

Because of its unusual number of different plant associations, possible through the unique combination of physiographic and ecologic factors which make it and contribute to its maintenance, you would find each visit to the swamp a memorable and varied experience. In the arborvitae swamp you would delight in the yellow and showy lady's-slippers; on the hemlock knolls the stemless pink lady's-slippers would attract you. You would find sphagnum hummocks in early spring brightened by the dainty magenta arethusa (*Arethusa bulbosa*) and later in the season abounding in the beautiful grass pink (*Calopogon pulchellus*) and the delicate rose pogonia (*Pogonia ophioglossoides*). Good fortune or good judgment might bring you to a clump of rare swamp valerian near a spring, or a pause in the " back-bending " traverse of the arborvitae swamp might reveal the tiny *Listera cordata*, a member of the orchid family infrequently found. Less showy, though attractive in a more subtle and quiet way, would be the various sedges of the genus *Carex*, certain rushes belonging to the genus *Juncus*, the rare false asphodel (*Zygadenus chloranthus*) related to the death camass of more western areas, and several species of beak rush.

Diligent search through the open marl might lead to an encounter with a small dwarf birch, reported to date from only one other swamp in western New York. A walk along the alluvial banks of Black creek on the north side of the swamp might reveal a fine stand of the native burning bush, or wahoo, no longer common in this part of the country. Near the edge of the yellow birch-red maple-elm forest of the swamp, and elsewhere, the profusion of color of 15 different goldenrods and as many asters during September would add much to your swamp treasure, as would the 13 kinds of violets found throughout the swamp in the spring. Of the goldenrods, the rarest is Houghton's goldenrod, known in New York State only from Bergen swamp.

These are but a few of the high spots, but surely they are sufficient to show that in Bergen swamp there is a rare collection of plants. Through the years since the last glacial period when the swamp began to come into being, Nature has been producing the exacting environment required by these plants and is even today maintaining their habitats.

Conservationists oppose any activity that would change this area, such as the digging of marl from the marl beds, the removal of sphagnum from the bogs, the draining of wet areas for agricultural purposes, the cutting of arborvitae for cedar posts and other lumbering operations that would open up swamp areas to the invasion of weeds. They do not wish to see Bergen swamp, a unique area which supports more than 800 vascular

plants, many of them not common and even rare in the flora of New York State, destroyed or changed or reduced to the commonplace by the activities of man. They strongly urge that the swamp with its many vegetational facets be preserved in its natural state for all time and be prevented from passing into the oblivion which has been the fate of many of the original swamps of the State.

A Sanctuary for Your Town

ELLSWORTH JAEGER
Curator of Education
Buffalo Museum of Science

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How to add to your community assets

NEVER IN THE HISTORY of man has there been a greater need for knowledge of Nature and Nature's ways. Our natural resources are fast disappearing. Our wildlife is always being threatened with extinction by periods of unwise hunting or fishing. Even our horticulture is threatened, should an unwise use be made of insecticides over a widespread area, for many of our useful plants would cease to exist if it were not for the pollination by useful insects. The draining of marshes and the cutting down of forests is fast creating drought conditions, which will ultimately result in desert lands.

It is high time that educators everywhere awake to the fact that both old and young should be given an understanding of the relation of birds, insects, animals, trees, flowers, clouds, marshes, streams and lakes to our own lives. When we realize that man has never created one thing without help from Nature, it is important that we try to understand this strange and complex force. It is important too, that we set aside areas where Nature can exist without interference from man, for it is in these sanctuaries that her children can renew themselves and repopulate the countryside.

People everywhere are beginning to realize that certain places must be set aside, places large or small, untouched by the hand of man, where Nature can find sanctuary. Think what an asset it would be for each community to have an area where Nature and Nature's children could live and grow as they pleased, where our native trees and wild flowers, our birds, animals and all living creatures would have a chance to be part of our everyday way of life.

Every city, town or hamlet, no matter how small, can afford a sanctuary, for in every area there are deserted farms and bogs, or swamps, within easy walking distance.

The first thing is to *want* a sanctuary, and then organize a sanctuary society that will secure the land and assume responsibility for it. You do not need money for

Photograph by Charles E. Simmons

Stoney Brook, Allegany State Park

improvements, for the idea is to let Nature take care of that.

The sanctuary society should include both old and young, and it should be organized as an educational institution so that the property will be tax free. Schools, churches, Scout groups, conservation societies and garden clubs should all be represented in the sanctuary society, and of course all nature-minded outdoor people should get behind the movement to promote it and perpetuate it.

Although it is a sanctuary, it can be used. But there are certain things you can not do in a sanctuary; for instance, no living thing is to be killed in this area. Nearly everyone has some pet aversion to something, and it is so easy to develop a number of reasons why some creature should be taken out that it would not be long before a number of wild things would be persecuted for one reason or another. If we establish a sanctuary it should be used as such in every way and no creature there should be killed. No fires should be built except in areas designated by the society. Trails may be made but nothing should be done either to add to or to take away from the land. Let the animals, birds and other creatures who wish move into this, their home. Let the trees and other vegetation reseed themselves. Do not take out dead trees — let the forest people make them into their apartment dwellings. If swamps, bogs, ponds and brooks are on the property they should not be tampered with. Do not harvest any nuts, fruits or berries, for they belong to the sanctuary residents. No wild flowers should be touched.

The community should be taught how to use the sanctuary by a series of entertaining lectures on the wildlife of the area. A program of this type will greatly add to the educational and social activities

of the community. Speakers may be secured from various agencies.

An interesting folder should be printed and circulated among junior and adult groups, describing the sanctuary, its trails and some of its residents, together with the few regulations as to its use. Adequate signs should be erected at the entrance and at the campfire areas, giving the reasons for the sanctuary. Its boundaries should also be posted against hunting, and the cooperation of the local game warden and state police should be asked in helping to protect the area. Education of the community, however, is the best way to protect it. The local newspapers and radio should be used in publicity and in public education.

Local photographers should be encouraged to use their cameras in the sanctuary by the sponsoring of exhibits and movies. Outdoor photographers are careful not to disturb their subjects.

A small corner of the local library's reading room, with a bulletin board, should be made available for the display of printed matter, photographs, posters, books and other reading material related to the sanctuary and its denizens, so that both old and young may use it.

Nature or explorer hikes should be planned on definite dates, led by competent members of the society or naturalists. Special hikes may be arranged by Boy or Girl Scouts, science classes etc., under proper leadership.

A Nature Sanctuary Society has been established for a number of years as a section of the Buffalo Museum of Science. It has a membership of over 100 active members and the society now owns two sanctuaries which were purchased by this group. The members have done a great deal of planting of wild flowers and plants which were thought to have been native to the areas. The society was originally organized by Professor William P. Alexander, who is curator emeritus of education at the Buffalo Museum of Science. The present head of the group is Arthur Brettle; Ruth V. Weierheiser is its secretary.

State Bird Clubs Organize

WINSTON WILLIAM BROCKNER
Vice President, The Federation of New York State Bird Clubs

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Teachers can contribute to the success of this new federation

"THE NAME of this organization shall be The Federation of New York State Bird Clubs. Its purpose shall be to unite and further interest in the study of birds in New York State, and to promote conservation measures favorable to them."

There, in a nutshell, is the story of this new state-wide organization. At this time it is most fitting to present to the teachers and other interested people of New York State a more complete picture and background story of this most important federation. As time goes by, this

Photograph by Val Webb

Officers, New York State Federation of Bird Clubs

(Seated, left to right) Mrs William English, Amsterdam; Dr Gordon M. Meade, President, Trudeau; Dr Peter Paul Kellogg, Secretary, Ithaca. (Standing) Fred Raetz, Rochester; Winston William Brockner, Vice President, Buffalo; Dr F. L. Gambrell, Geneva; Eugene Eisenmann, New York City.

organization will continue to grow and expand and make its influence felt in every sector of New York State. In no small degree our success will hinge upon adequate and wholehearted support of the teachers of this State.

In some respects, so far as the author is concerned, the idea for a state bird club was war-born in the fox-holes of Italy. To keep things on a higher level, I dreamed of better days at home and plans for the future, one of them being a state-wide organization of birders. Upon returning to Buffalo, I spoke to the Buffalo Ornithological Society on February 13, 1946, regarding the possibilities of such a club. They were all for it. A friend from Rochester was in attendance at that meeting. She carried the word to that city, where others had entertained similar ideas. A dinner meeting was arranged in Rochester on March 22, 1946, and interested people from Buffalo and Rochester exchanged ideas on such a project. Dr Gordon M. Meade, now of Saranac Lake, and our first president, was at this meeting. Doctor Meade has supplied the organizational committee with leadership and guidance.

Our first open meeting, held on December 7, 1946, at the Rochester Museum of Arts and Sciences, was attended by delegates from 12 bird clubs, mostly from the western portion of the State. All the representatives were most enthusiastic about the proposition and a committee was formed to draw up a constitution and plans of organization.

On February 8, 1947, this committee met at Cornell University, where we commenced working on the constitution in earnest. At this meeting we had state representation for the first time from Buffalo to New York City.

On the week-end of October 25–26, 1947, we had a memorable and most successful meeting at Amsterdam, as guests of the Sassafras Bird Club. At this, our most recent session, we assumed temporary organization. Delegates from 12 societies attended. In addition to a great amount of work on the constitution, the following temporary state-wide officers were elected: president, Dr Gordon M. Meade of Saranac Lake; vice president, Winston William Brockner of Buffalo; corresponding secretary, Dr Peter Paul Kellogg of Ithaca; recording secretary, Fred Hall of Rochester; treasurer, Guy Bartlett of Schenectady. This meeting served in many ways as a model for those to follow. The Amsterdam club under the efficient guidance of Mrs William B. English, head of the local committee, provided the visiting delegates with an unforgettable time.

The temporary officers are still working on fine points of the constitution, and all bird clubs in the State will shortly receive a copy. This will serve as an invitation to join the federation. The constitution is drafted so that it will infringe in no way upon the autonomy of the local clubs. Provisions are also included for individual membership.

We are firmly convinced that there is an urgent need for this organization. The reasons for its existence are numerous. Here are a few: There are many state-wide research projects that we can coordinate and cooperate on, such as migration routes and information on bird invasions as, for instance, that of the snowy owl. We will be able to disseminate authentic information to all quarters of the State. We can aid small clubs and help to form new ones in areas that at present have no local societies. Eventually we hope to have a publication, monthly or semimonthly, where interesting field records and notes and papers on research can be published. We hope to spread good-fellowship among the ornithologists of the State. Finally, and as important as any other reason, we hope to cooperate on conservation matters. As individual clubs we are very weak in this department; as a state-wide organization we can exert a great influence for good.

Our constitution calls for many active committees. The job is big, and we will need wholehearted support and cooperation. In addition to the periodic meetings we are planning to have field trips at the proper time.

To date, club and delegate cooperation has been most laudable. The Linnean Society of New York City is very interested and has sent a most cooperative and helpful delegate in Eugene Eisenmann. The Watkins Glen Bird Club has been represented by Louise Helfer, the Watertown Bird Club by Mrs James A. Common, the aforementioned Sassafras Bird Club of Amsterdam by Mrs William English, the Keuka Park Conservation Club by Professor Hazel Ellis, the Genesee Ornithological Society of Rochester by Fred Hall, Fred Raetz and Dr Gordon M. Meade, the Elmira Garden Club, Bird Section, by Dr and Mrs Harry C. York, the Eaton Bird Club of Geneva by F. L. Gambrell and Ethel Murden, the Cayuga Bird Club of Ithaca by Dr Peter Paul Kellogg, the Buffalo Ornithological Society by Winston William Brockner. These are only a few. There are many, many others, both clubs and individuals.

For further information please write to the author at 63 Ardmore place, Buffalo 13, or to the president, Dr Gordon M. Meade at Trudeau, N. Y.

Native Cold-Hardy Plants

FREDERICK HOUGHTON
Buffalo Museum of Science

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Photographs by the author

History can be written by plants

THERE WAS A TIME when the Arctic regions of North America probably appeared much as they do now — cold, bleak and desolate but enlivened during the short summers by patches of gay wild flowers. After long centuries, there came a time when the sun shown less warmly, winters became longer, and snow remained unmelted where it had dropped. As time passed, the snow piled up and solidified until it covered all the northern land with a thick mass of ice, a great glacier. The excessive weight of this in the North pushed the edges of the glacier outward and it moved slowly southward, destroying all vegetation in its path.

Ledum (Labrador Tea) and Kalmia Growing at Timberline, Whiteface Mountain

In protected spots on the mountains to the west some of the vegetation seems to have survived. Although the plants which were nearest the edges of the ice were destroyed by the increasing cold, those remote from it continued reproducing themselves. As a result the glacier was bordered by a wide band of vegetation, the hardiest ones nearest the glacier merging gradually to the south with the more tender plants which were also being pushed southward. At that time the flora of nearly all New York was confined to this wide band of hardy plants along the southern border of the ice.

After innumerable long cold winters, the sun began to shine more warmly and very slowly the ice melted back. The vegetation that had become inured to the conditions along the cold ice-front and that had contrived by various ingenious devices to perpetuate itself began to occupy the newly exposed land. Forests of hardy firs and spruces followed closely the northward retreating ice and under them mosses and ferns provided protection for less hardy plants. The band of vegetation which had at all times fringed the glacier moved northward with it, so that, when the last ice had vanished, the plants that could endure cold had pro-

gressed northward to the Arctic regions and the more tender plants had continued their northward movement until they had reached the limit of their endurance of cold.

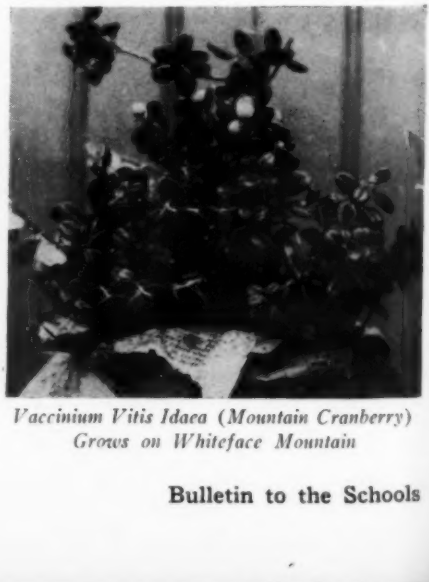
Wide forests of maple and birch, poplar and cherry finally covered the land and in their thin spring shade the warming sun coaxed from the cold soil beneath them a great array of early flowers which had been able to perpetuate themselves only by hastening to use to the uttermost every bit of the short summer sunshine. So firmly was this habit of haste fixed with them that even after the necessity for haste was ended they continued the habit.

For many years, botanists have known that in the gorge of the Genesee river grow three plants whose normal habitat seems to be the colder regions of northern America: mistassini primrose (*Primula mistassinica*), common butterwort (*Pinguicula vulgaris*), and yellow mountain saxifrage (*Saxifraga aizoides*). The latter two grow not only in Greenland and northern Canada, but also thrive on the shores of the Arctic ocean in Siberia and Europe.

These three constitute a group of plants that grow together in a few places in New York. The best known locality is in the gorge of the Genesee river, where they cling to the wet walls above the Lower Falls. Other groups are to be found in deep gorges along Cayuga lake and in Fish Creek gorge at the east end of Oneida lake.

It is not so well known that there are many other plants of New York that also grow on Arctic shores and a few that follow these shores entirely around the North Pole. For instance, there is the brittle fern (*Cystopteris fragilis*). This is a frail little fern that grows on our limestone ledges (although its range includes the tropics), and is circumpolar in extent, flourishing along the shores of the Arctic ocean from Canada, through Alaska, to Siberia and Greenland. Even some of our plants that we think of as being native to temperate climates only, are circumpolar. The marsh marigold (*Caltha palustris*), which adorns our swamps in spring with pure gold, beautifies in similar fashion the shores of the entire Arctic ocean. Equally widespread is the fireweed (*Epilobium angustifolium*), which with our lovely harebell (*Campanula rotundifolia*) softens the bleakness of those desolate strands.

Some of the plants of our cold bogs range far to the north. The little insect-eating round-leaved sundew (*Drosera rotundifolia*) thrives north of the Arctic circle. The pretty little shrubby cinquefoil (*Potentilla fruticosa*) and the pale laurel (*Kalmia polifolia*), both to be found in many of the bogs or swamps of western New York, are also found at Cape Barrow on the shore of the Arctic ocean. Blueberries (*Vaccinium angustifolium*) mixed with seal fat make a favorite dish for Eskimos in northern Labrador. The Eskimos also relish, as a



Vaccinium Vitis Idaea (Mountain Cranberry) Grows on Whiteface Mountain

change from their meat diet, the fruits of a shadbush (*Amelanchier*) and pin cherry (*Prunus pennsylvanica*).

Besides the brittle fern, others of our ferns reach the Arctic ocean. Rusty woodsia (*Woodsia ilvensis*), thriving in cold gorges in central New York, is circumpolar, and smooth woodsia (*W. glabella*) reaches Greenland. Long beech fern (*Dryopteris Phegopteris*) and our delicate and lovely oak fern (*D. disjuncta*) both grow in Greenland, along with the tiny grape ferns (*Botrychium Lunaria* and *B. lanceolatum*). Even the frail green spleenwort (*Asplenium viride*) withstands the Greenland winters.

Marsh Marigold Blooms on the Shore of the Arctic Ocean

In addition to these plants of our hills and lowlands, many of those that mantle the summits of the Adirondacks seem to be subarctic-alpine plants. Ground fir (*Lycopodium Selago*), which holds to the cold summits, and stiff clubmoss (*L. annotinum*), which descends to our high hills, are both circumpolar, reaching entirely around the Arctic ocean. The tiny shrubs, black crowberry (*Empetrum nigrum*) and alpine azalea (*Loiseleuria procumbens*), and the trailing herbaceous willow (*Salix herbacea*), which creeps under and through the thick mats of moss, are all circumpolar. Diapensia (*Diapensia lapponica*) and three-toothed cinquefoil (*Potentilla tridentata*) form great masses on the stony summits of Mount Marcy, yet they grow equally well in Greenland. With these grow the widely spread fireweed (*Epilobium angustifolium*) and the lovely pink pale laurel (*Kalmia polifolia*) of our bogs. Of the plants on Mount Marcy, 23 are considered to be true alpine plants and of these not more than ten reach the Arctic ocean. Among these true alpines are ground fir (*Lycopodium selago*), dwarf birch (*Betula glandulosa*), Lapland azalea (*Rhododendron lapponicum*), and a blueberry, the bog bilberry (*Vaccinium uliginosum*).

The distribution of vegetation on the Adirondack summits illustrates exactly the movement of plants as they followed the retreating glacier. The mountains are ringed about by indefinite bands or zones of vegetation, each zone determined partly at least by temperature. Just so the glacier was bordered by similar bands. As the zones of hardy plants moved northward with the ice-front or upward on the mountain sides, their places were taken gradually by the more tender plants which are supposed to need the warmer conditions to be found farther south or lower down. These moved northward or upward until they reached a point where they could no longer endure the minimum temperature beyond. In a succession of hot summers these

plants would reproduce northward or upward to mingle with hardier plants. In a long succession of very severe winters those farthest north or highest up would perish. So, in a warm cycle, southern plants like Indian plantain (*Cacalia*) would follow up the Allegheny valley from the south, and bluets (*Houstonia caerulea*) of the hills would reproduce upward on Mount Marcy. If a cold climatic cycle followed, these would die.

The distribution of vegetation on Mount Marcy seems to indicate that the normal movement of our plants is from south to north and from the bases of mountains toward their tops, and that not only are plants which have become accustomed to temperate conditions able to move into and endure colder conditions but that Arctic and alpine plants which have been inured to severe cold are unable to endure warmer conditions. As a consequence, although redbud (*Cercis canadensis*) can be moved from the Potomac river to our gardens in western New York, *Potentilla tridentata*, removed from Whiteface mountain to the same gardens will perish.

New York Invaded!

GORDON M. MEADE M.D.
President, New York State Federation of Bird Clubs

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A picturesque visitor from the far North comes in search of food

IN THE BARREN tundra country of the far North live the lemmings — small rodents which form a principal food of the handsome snowy owl. The number of lemmings seems to rise and fall in a rhythmical fashion over four or five-year periods. When the lemming population reaches its lowest point the food supply of the snowy owls is greatly reduced. Rather than stay in the North to starve, these owls spread their great wings and start southward in a vast invading army on the hunt for food.

When this happens they appear in southern parts of Canada and the northern United States where they are not ordinarily found. The records show that such an invasion occurs almost every fourth or fifth year but some years it is much greater than others. The winter of 1945–46 brought one of the heaviest ever seen. Doctor Gross of Bowdoin College has found that in the 122 years between 1823 and 1945 there have been 24 such invasions — an average of one every five years.

These spectacular events follow a general pattern, of which the recent one was typical. The beginning is often heralded by a notice in a newspaper of a town in one of the northernmost counties

Photograph by Dr John B. May.
Courtesy of National Audubon Society

The Unsuspicious Bird Selects a Conspicuous Resting Place

along the St Lawrence river that during the first week in October several great white owls have been seen or shot. From then on, the number of reports grows rapidly as they spread southward over the State until the peak is reached in late November or early December. From December 10th on, the numbers decline.

This decline is due in part to the great numbers which are shot by farmers and hunters. The urge to shoot these slow-flying, rather unsuspicious birds is strong. They are shot for two reasons: first, for mounted trophies and second, because of the feeling that they kill large numbers of game and chickens. While it is true that they do kill some pheasants and ducks, the stomachs examined contain for the most part remains of rats, mice, rabbits and squirrels. The amount of harm done is relatively small and the slaughter of owls which occurs during each invasion is inexcusable. During the winter of 1945–46 I received records of 839 birds shot in New York State and I am sure that this is only a fraction of the total actually killed.

The snowy owl is one of the largest of owls. The females are somewhat larger than the males, but the wingspread averages around 60 inches and the length 24. It is not a heavy bird, the average weight being only three and one-half pounds. A great deal of its size is made up of feathers. Snowy owls vary in color from almost pure white to some males that are heavily spotted with black or dark brown.

When a map is made of the places where the birds were found it is seen that they are most common near bodies of water — the south shore of Lake Ontario, the Hudson-Mohawk River valleys, and the shores of Long Island. It is true that they appear in the more central parts of the State but not in as great numbers. They are birds which prefer open fields, beaches, marshland, and often are seen on fence posts, telephone poles, barn roofs, haystacks and the tops of buildings. Reports of them in cities are not uncommon. They do not like wooded country and hence there are almost no reports from the Adirondacks and Catskills. Some wanderers were seen far out at sea and at least one came down on a ship 300 miles east of the Atlantic coast. In this latest incursion there were thousands seen or killed in every northern state east of Minnesota and some wanderers went as far south as Maryland.

Once the birds have reached a certain point they often seem to stay there for fairly long periods and will be seen day after day around the same field, marsh or building. In 1945 two birds spent several weeks on top of the General Electric Building in Schenectady.

By the end of February very few were seen. There were some April records and one as late as May 16th. In all, over 1200 birds were reported from New York in the winter of 1945–46.

A few of these northern visitors come into New York every winter but it will be 1949 or 1950 before they come again in numbers. Remember to keep watch for them, keep a record of how many you see and where and when you see them, and send the records to me or to the State Museum at Albany. All records from the United States and Canada are gathered together in Toronto and thus we will gradually learn more about these incursions by the white army on wings.

Acknowledgment

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The Opossum in New York State

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Photographs by the Author

New York's only marsupial moves upstate

THE FIELDS AND WOODS of New York State support many interesting animals, but none more bizarre than the 'possum. About the size of a house cat, with grizzled white and gray fur, a long naked prehensile tail, piglike snout, white face and small sunken eyes, this creature is of considerable interest to the nature lover and professional biologist alike. Large opossums may weigh 10 to 12 pounds, but most are smaller. Australia is the home of the kangaroo, koala and many other marsupials, but our country can boast of only one native species, the opossum.

In my early years, I lived on Long Island, where I became well acquainted with the opossum. When I moved to western New York a quarter century ago the opossum was unknown. A few years passed before reports of its occurrence were noted. Eventually this animal became a familiar sight. A freshly killed specimen on the highway, toll of the automobile, was often the first intimation that this southerner was spreading over the State. Today, the opossum is known in northern countries where previously it was rare or absent. In this age of guns, traps and mounting highway mortality, it is pleasant to know that one animal is increasing where so many other natives have fared for the worse.

The opossum is a denizen of the fields, woods and bottomlands. While an adept climber, it spends much of its time on the ground, utilizing a hollow log, a woodchuck or skunk burrow, or the retreat

Beadlike Eyes, Set Deep in a White Face, Distinguish the 'Possum

afforded by old barns and other dwellings. During the colder months of the year it may pass days in slumber, retreating to its warm nest of dead leaves and grass, where it whiles away the long nights of winter in deep sleep. This is not the torpor of hibernation such as one finds in the woodchucks and jumping mice, as is evident from the telltale tracks in the snow, for the opossum may be up and about in the coldest weather. The five long fingers of the hand, with sharp claws, leave clear impressions, but it is

the characteristic stamp of the hind foot that proclaims the track-maker. For unlike the marks of other native mammals of comparable size, the opposable toe, set at a right angle to the others, reveals its certain identity. No tail mark is left, for this structure is held well up as the animal shambles about in its search for a frozen tidbit.

The diet of the opossum is a varied one, for the animal is no epicure. Fruits and berries in season, the hordes of insects and luckless mice all help to stay the pangs of hunger. I have found newly hatched turtles, scarcely the size of a half-dollar, in the stomachs of these creatures. Ground-nesting birds, offal and garbage are all acceptable. Corn in the milk is often torn down, stripped and eaten. All too often such damage is attributed to the raccoon and skunk. The damage may frequently be traced to the 'possum, which has a fondness for such delicacies.

Naturalists have long been interested in the curious reproductive behavior of the pouched animals; the opossum is no exception. Unlike most of our common species, which undergo a relatively long period of embryonic development within the mother, the opossum gives birth to her young a mere 12 days following mating. These tiny lumps of flesh, so small

The Inquisitive Opossum Explores Every Stub and Rotten Snag for Tidbits

that 20 can fit in a teaspoon, seem quite unsuited for the outside world. But careful scrutiny will reveal one structure, and a mighty necessary one indeed, with which they are endowed. We refer to the muscular forelimbs with stout sharp claws. These enable the tiny youngster to clamber, hand over hand, to the brood pouch of the mother. Into this the youngster tumbles and quickly grasps a nipple. The pouch is home for the 8 to 13 young during the next month. Here they nurse and sleep, never forsaking the maternal font. Another week will pass before they attain the size of a house mouse. Soon the youngsters are clothed in a silky covering of hair, the color pattern not unlike that of the parent. For another month they are dependent on the parent, climbing on her back or returning to the pouch for meals. Eventually they leave the mother to take up an independent existence and, in the fullness of time, assume the chore of populating the State with still more of their kin.

Limited information on the breeding habits of the opossum in New York State indicates a single litter a year, the young being born some time in April. Here is an opportunity for the young naturalist to make a real contribution, recording data on the size and number of young from females that may come into his or her possession. As with other and rarer animals, we still have much to learn regarding the habits of the commonest species. Only by the joint effort of many individuals can important facts regarding the life history of our own State's mammals be fully recorded.

Enemies are numerous, particularly the larger hawks, owls and predatory mammals. Large snakes have little difficulty in disposing of a young opossum. The chief enemy is, of course, man with his dog. The opossum may gain some measure of protection from its well-known habit of feigning death. This may be quite realistic, for the animal is known to shut its eyes, loll the tongue from open jaws and retain such a position for many minutes. It is questionable how much survival value such a stunt might have.

The long head houses a surprisingly small brain. This can readily be demonstrated if one has the skull of an opossum and that of a house cat. Fill each brain cavity with cornmeal, then pour the meal into a teaspoon. The ratio of the opossum to that of the cat is one to five. But brains alone do not dictate the success of an animal. The opossum, in spite of years of persecution, not only has more than held its own but is rapidly increasing all over the United States, occupying areas where a few years ago it was unknown. Skull remains have been taken from rock strata that were laid down 60,000,000 years ago. These specimens prove to be nearly identical, indicating little change in a period that has seen the evolution and disappearance of many other species.

The fur of the opossum is not of the best quality and does not wear too well, although rather attractive in appearance. Trappers seldom realize a dollar for the finest pelts. But, as with other resources, quality is often not so desirable as quantity. The tremendous number taken each year in the United States places it well up on the list of our important furbearers. It is eaten by many in the South, and in the future may well find a place in the menu of northern hunters. Perhaps its greatest importance lies in quite an unsuspected field. Raccoon hunters take it in increasing numbers on their fall hunts. If it can, in time, reduce the pressure on the "ringtail," even at the occasional sacrifice of its own life, it will have served us well. There is little immediate likelihood that man will make any serious inroads on the opossum

population for many years to come. At the present rate of increase, it threatens to outlive mankind.

I have long been interested in the northern spread of the opossum. Records are now available from all the Southern Tier counties, and in 1933 I recorded the animal in the intervening areas from Olean to Rochester. Further information indicates the establishment of this mammal in all the counties of central and western New York. If readers can provide additional records from northern New York, particularly from counties bordering the Great Lakes, the information would be useful in plotting the northward march of this curious and interesting species of our state fauna. Records of opossum on the highway and trapped specimens will in time provide useful data. It is particularly important to record females with young, noting the date, approximate size of the young, numbers and other general information.

We Should Know Our Snakes

HERB. F. NICHOLS
Schaghticoke Snake Farm, Wingdale
Photographs by the author

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A friend of the reptile speaks reassuring words

WE HAVE in New York State 15 species and subspecies of snakes that are native to the State. Of these, only three are venomous — the timber rattlesnake, the massasauga rattlesnake and the copperhead. Even though their bite is poisonous, they are not as dangerous as many persons believe. During early days many persons were bitten and many deaths occurred from these bites, but today modern science and modern medicine have changed the picture. In former times the death rate from venomous snakebite ran as high as 96 per cent while present-day figures show complete recoveries to be 96 per cent of the cases. It is rare today for a person to be bitten, and rarer still for the bite to be fatal to the victim.

Years ago the lack of knowledge concerning snakebite produced many strange and weird treatments, most of which were of little if any benefit to the victim. Some of these so-called cures caused more harm than good, while to others could be laid the direct responsibility for the snake victim's death. Even today we have no cure for venomous snakebite but we do have a method of treating it that is so nearly perfect that it has completely reversed the fatality-recovery figures. This treatment is the cut and suction first aid, followed by injections of snakebite serum.

In earlier days, the first thought was to pour whisky down the victim's throat and keep pouring it down, the more the better. The alcohol simply increased the heart action, sent the blood flowing faster, and quickly distributed the venom throughout the entire body. Today we know the venom must be deposited in the blood and lymph to be effective and so we know we must keep heart action down to as nearly normal as possible. This puts alcohol and any other heart stimulant on the forbidden list, unless it is ordered by and given under a physician's supervision. Exertion must also be kept down.

If we live in, work in or intend hiking through venomous snake country, we should provide ourselves with a snakebite outfit, as a safety measure. There are three or four different types of these available and all are good. They are small and compact and take up little room in a pocket or knapsack. They can be obtained at any good drug store at small cost, and with care will last for years. When you get the outfit home, open it and study the instruction sheet. Make believe you have just been bitten and go through all the movements of treating the bite. Practise this over and over until you can go through the whole routine without having to refer to the instruction sheet. You will find that your fingers soon attain speed and accuracy in their movements, and this is what you need in treating snakebite. A snake strikes fast, the venom works fast and your first-aid treatment must be fast. After completing first aid you can forget about speed. While you are on the way to the doctor, it would be better if you were compelled to crawl a mile on your hands and knees than to run a hundred yards.

When you reach the doctor, explain the entire happening to him. Tell him what kind of snake bit you, if you were able to identify it; what treatment you have given the bite and anything you might know concerning your general health. Turn yourself over to his care and then relax. If you have used proper first aid and are in good to perfect health, you have no need to worry. Above all, do not be frightened at the abnormal swelling the venom causes or the different strange sensations that may run through your body. Worry and fright have killed more persons than has snakebite.

Comparing this present-day treatment to that of 50 to 70 years ago, we can easily understand the reason for the big upward sweep of the recovery figures. A partial list of the oldtime cures reads like this: Immediately immerse the bitten part in kerosene or turpentine and keep it there until the pain stops; cut out the bitten part with a sharp knife (no mention made about sterilizing the knife) and rub in gunpowder; immediately kill a chicken, split it in halves and apply one half, hot and bleeding, to the bitten area; kill a deer as soon as possible, preferably a doe, remove the heart and liver and bind these over the bitten part. (This was used realistically and authentically in the motion picture "The Yearling.") There are many more and all of them make it appear that a lot of faith and hope were included in these so-called cures. There are cases of a man being bitten while chopping wood a distance from the house. If the bite was on one of his fingers, he would quickly chop off the finger. Of all the oldtime treatments, this method was the safest, if he was not frightened by the sight of blood or afraid of bleeding to death before he reached help.

Few people know that none of our snakes will attack us without provocation. Fangs and venom were given to some species so they might obtain food easily by killing it with their poison and as a defense for their own protection.

The constrictors' powerful muscles are for the same use: first to obtain food and second for self-protection. The other snakes have only sharp needlelike teeth to use for obtaining food and for protection. Snakes are afraid of us and we should know that and show them we know it. Those of us who are afraid of snakes should not let them know it. In this way everything is balanced and we and the snakes can live side by side, with no harm coming to either.

Snakes, like many other children of the forests, have been steadily persecuted down through the ages. They have been accused, and very wrongfully, of many kinds of bad deeds and strange and odd actions. They were said to be slimy, their venom would rot the flesh of humans in a short time after being injected; the constrictors were said to wrap their powerful coils around children, crush them to a jellylike mass and then swallow them; those species that hissed and sissed blew out a deadly poisonous gas; their forked tongue was a death stinger; and one and all possessed the power to hypnotize.

The Author with a Newly Captured Copperhead

Farmers accused some species of stealing quantities of milk from their cows. Many hunters accused them of killing and eating game birds and small game animals and fishermen blamed them if certain game fish were scarce.

One species was said to rear up, take its tail in its mouth and roll after people; when it caught up with them, it would release the tail and jab it into the unfortunate victim, causing quick death. If you jumped behind a tree, at the very last moment, the snake would jab its tail in the tree and could be quickly killed. The green leaves of the tree would turn brown, however, and the tree would be dead in a matter of minutes. Another was said to break up in small segments when lightly hit with a stick; when all was quiet, the segments would join together again and the snake would crawl away as if nothing had happened.

The rattlesnake was said to be the most dangerous in August because it shed its skin at this time of year; it was said to be blind then and would strike at any movement or noise near it. Incidentally, this is still a firm belief with many of the oldtimers who have lived in rattlesnake country all their lives.

Another story that has been told and retold and has even appeared in print, concerns a rattlesnake, an old gentleman and a pair of leather boots. The snake

struck the boot, drove a fang through and into the leg within and the fang broke off in the boot. The man died from the effects of snake poisoning. Years later, the story goes, the grandson, a man in his late forties, found the boots in the attic. The story has him putting on the boots, and dying soon after. A doctor's examination proved that he too died from rattlesnake venom. Thus the list goes on and on and the stories are told and retold endlessly.

Each summer, while I am exhibiting my collection of reptiles and talking about them, both children and grown-ups bring me one or another of these oldtime tales. A hunter or fisherman or farmer will ask me why I don't kill "those destructive snakes" instead of making pets of them. In explaining the truth about snakes, I find the children hardest to convince. They have heard many of these stories from their father, grandfather or grandmother. And show me the child who will stand quietly by and have their parents or grandparents contradicted!

To show how wrong these stories and beliefs are, I will explode them, one and all, beginning with the first one I cited. Snakes are slimy? No, no snake is slimy. Their scales are dry and glossy and have a metalliclike feel. Venom rots the human body? No, but it will destroy the flesh tissue to a certain degree in some cases. This destruction does not go far from the immediate vicinity of the fang punctures.

Do constrictors crush and eat people? There is nothing on record to show that this has ever happened. They wrap their powerful coils around their prey (food) and suffocate it, but if bones are broken it is by accident rather than by design.

No snake that hisses blows out a deadly gas. The hissing is their weapon of defense, calculated to scare off threatening danger. Is a snake's tongue a deadly stinger? Again the answer is No. Snakes can not hear noises and they have little sense of smell. In the roof of the mouth is a very sensitive organ, the tongue flicks out and is drawn back across this organ. This action furnishes the snake with a taste sensation that takes the place of the sense of smell. Snakes, while crawling slowly along, continually flick their tongue out and this created the expression that "they taste their way along."

No snake has the power to hypnotize. The bird, frog or mouse that sits motionless, watching a snake crawling toward it is simply paralyzed with fear. I have watched both men and women who feared all snakes sit motionless and watch a harmless blacksnake crawl closer and closer. Fascination and rigid muscles held them there but when I spoke the sudden sound would cause them to leap quickly away.

Now we come to the "strange story department." Many persons claim they have actually seen a blacksnake or a milk snake in the act of milking a cow. Many also claim to have seen the ghost of a departed relative or friend and to have talked with this ghost — but up to the present time, no one has ever produced an authentic photograph of either. I have yet to see the cow that will submit to having a snake's needlelike teeth puncture her teat. Moreover, snakes do not have throat muscles strong enough to draw milk from a cow and if they did, where would they put the amount of milk the farmer claims the cow is short?

The hoop snake is the one accused of rolling after people. This snake was so named because of its peculiar habit of lying in a circle, head to tail, resembling a hoop. It does not coil like other snakes, does not rear up and take its tail in its mouth and roll, and does not have a death sting at the tip of the tail. It is a

harmless and nonvenomous species. The last scale on the tail forms a sharp point and the snake has the odd habit of moving this around against the hand holding it and on rare occasions, has been known to puncture the skin slightly.

The glass snake — in reality, a legless lizard possessing eyelids and ear openings, which no snake has — is supposed to break apart when lightly hit. The truth is that approximately an inch of the tail-end will disjoint, if the lizard is captured or held by the end of the tail. If it is released, it will crawl away and in time a new tail-end, more blunt than the original one, will grow out. It can not disjoint the other parts of its body, however, and if it could, there is no possible way for the sections to rejoin and the lizard still live.

It is important to disprove the story of the leather boots for it is continually being told and is believed by many persons. The fangs of our native timber rattler will not penetrate heavy leather shoes nor rubber-bottom leather-tops. Those of the eastern diamondback, commonly called the Florida rattler, and those of the western diamondback, or Texas rattler, are much larger, stronger and longer and will penetrate leather and rubber. Both of these rattlers are larger and stouter than the native New York State rattler. Presuming the rattler in the story to be one of these species, the fang could have punctured the leg in the leather boot. It could have become imbedded in the leather and been broken off and remained there during the intervening years. The grandson could have found the boots and tried them on as a lark and scratched his leg against the imbedded fang but he could not have died from snake poisoning from this scratch.

Snake venom soon crystalizes after being ejected from the fangs, unless it mixes with some other liquid. In a

Timber Rattlesnake at Hibernating Den

fairly short time light rays, fluctuating temperatures and changing atmospheric conditions rob these crystals of their potency. Three ordinary drops of venom is considered to be a lethal dose to the human body. When we add all these proved facts together, we quickly see that this supposedly "true happening" is nothing more than a tall tale. Its telling simply provides interest, thrills and enjoyment to any person who does not know snakes.

I read a story recently, written as a true story, in which the writer told of going with a collector for a zoo on a collecting trip after rattlesnakes. He explained about the fangs and the venom and then went on to say, "Rattlesnakes shed their rattle when they shed their old skin, during each August. They are extremely dangerous at this time for they can make no rattling sound and the unwary person who ventures near them is bitten before he realizes a snake is near." That writer, I fear, knew nothing about rattlesnakes and cared little about the untruthfulness of his statement or the damage it might cause in the enjoyment of many hikers.

The rattlesnake, like all our other snakes, sheds its skin three to six times during the time it is out of hibernation,

from May to October. The lenselike eye-coverings peel off, still attached to the old skin. The very thin tissue covering of the tongue is also shed and the two old fangs loosen and drop out at the same time. Two new fangs are already in place, however, before the old ones are shed. The rattle is not shed but instead is lengthened by a new segment or ring that grows out from the rattle-root each time the skin is shed. The only time any part of the rattle is lost is when it has become quite long, becomes caught between rocks or logs as it is dragged behind the snake and is broken off. Each segment or ring is loosely snapped over the adjoining one and can be easily pulled off with the hand.

A snake is never entirely blind when it is shedding but its sight is greatly impaired by the eyes being out of focus while the lense-like covering loosens from the eye. They are no more dangerous during August than they are during any other month when shedding. After each shedding, the snake emerges in a new brightly colored skin, sharp-visioned eyes, keen tongue, brand new fangs and slightly longer rattle.

All our native New York State snakes are our friends rather than our enemies, and we should not believe everything bad that we read or hear about them. Their food consists of mice, rats and other small rodents; insects and insect larvae, grubs, slugs and worms. With few exceptions, these are all pests and highly destructive to man. Like snakes, the owls and hawks were once classed as destructive pests and were persecuted as such but during recent years of extensive research they have been found to be more beneficial than destructive; and today most of our native owls and hawks enjoy legal protection.

Now that we have found that most of our snakes are a big help to use in controlling destructive rodents and insects, why not make a beginning by giving these legal protection? Let's stop the common practice of clubbing to death each blacksnake or garter snake or milk snake or the pretty little green grass snake. They are no good to us when we kill them. We have nothing to fear from the nonvenomous ones and little to fear from the venomous species, so let's not be afraid of them and persecute them. Let's treat them as we would a rare wild flower or beautifully colored bird — admire but do not destroy.

If we want more information on any snake, a trip to the library will provide us with good reptile books; or a visit to our local zoo or museum to ask questions of people who know the true answers to all questions on snakes will be our biggest help.

When I got to know and understand and like snakes, I adopted a slogan. I give it to you and hope you will spread it among your friends and acquaintances. It is: "Keep 'Em Alive and Crawling, Wherever and Whenever Possible."

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Thou, whose fame
Searchest the grass with tongue of flame,
Making all creatures seem thy game;
When the whole woods before thee run,
Asked but — when all is said and done —
To lie, untrodden, in the sun!

Excerpt from "Crotalus" by Bret Harte

Reprinted from The Poetical Works of Bret Harte, by permission of Houghton Mifflin Company.

An Amateur's Arboretum

WILLIAM A. OBORNE
Chatham Center

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How to deal with the children of the forest

THREE YEARS AGO an arboretum was started at Far Fields, approximately 20 miles southeast of Albany. The project, strictly noncommercial, was begun with the primary objective of growing as many species of the coniferous evergreens as this rather harsh climate will support. Plans call for gradually reclaiming 92 acres of what may be classified as largely waste land. In the course of time the property will become a useful, productive asset instead of a liability; in addition, something of value may be contributed to natural science.

Poor, rocky land is being reforested; protection belts are being formed as wind and snow breaks; land with a poor mantle of top soil, caused by years of erosion, is improving with proper planting and is being assisted to recover a natural strength and sufficient top soil thickness.

Up to the present time more than 40 species and subspecies of the family *Coniferae* are being raised. It appears that most trial specimens planted will withstand this climate. The Sitka spruce perished the first summer during a dry period and the Engelmann spruce failed to survive the first winter. Both species will be tried again. There is some doubt about the final result for the Sitka spruce as it likes the dampness and rather even temperature of the Pacific Northwest. The Engelmann spruce is indigenous to the Colorado Rockies and better results are anticipated with these trees.

Ultimately it is hoped to have a collection of about 100 species and subspecies. Several untried exotic species will be set out next spring; some specimens will come from very long distances. At present about 4000 trees are planted each year. Plans call for increasing that number greatly with seed beds of white fir to be started next year. It is hoped that by 1950, 15,000 trees will be planted each year.

Competent advisers have stressed long-range planning. They point out that it is necessary to visualize the plantings more than five, ten and even 50 years hence, long after the present owner will be gone.

Many people have ridiculed the idea of setting out two-year-old seedlings or three-year transplants. They say the planter will never live to see them full-grown. It is generally true that such people really do not know how long it takes a seedling tree to reach maturity and the answer to their comment is that they now enjoy full-grown trees only because someone, long since dead, had the foresight to plant them — if Nature did not.

As for me, I can enjoy the children of the forest quite as much as the grown-ups. The young trees are gradually and continuously changing. On Christmas Day I explored under the snow to peek at some very young white firs. I found them with full-dress winter buds. I know that shortly after the red-winged blackbirds return, those tight buds will burst forth into spring growth to become branchlets. To those who know them

with their glaucous colored long leaves they are beautiful. In their full growth single white firs have been reported as over 100 feet high.

Gray pines or jack pines are generally not considered to have ornamental value. In examining some of them last summer I was most interested to see several individual trees, scarcely 15 inches high, that had borne cones. Many were planted on poor, rocky ground where even weeds do not thrive, yet it was not unusual for last season's growth to exceed 18 inches for this species.

While this arboretum is still in its youthful stage and spectacular results can not be obtained in such a short time, results even at this early date are encouraging. Records are kept for future reference.

Numerous pamphlets and books have been used as a guide. One book in particular that is constantly used is The Cultivated Conifers in North America by Liberty Hyde Bailey. Valuable advice has come from employes of the Conservation, Education and Public Works departments of New York State. Several farmers have been helpful with their knowledge of local soils; some of these have practised reforestation to some extent. On a midwinter trip into the Adirondacks two years ago, I spent an evening at the headquarters of the district ranger, talking with the observers and rangers quartered there. I asked ques-

Photograph by Don Simmons

First Plantings in Far Fields Aboretum

Courtesy of State Conservation Department

Boy Scouts at Camp Hawley Arboretum, Niverville

tion after question on cone-bearing trees until the late hours and the response of those practical men was something never to be forgotten. I have always remembered and practised their advice.

Based on such experience as I have had, the following recommendations are made for those who wish to plant young conifers but lack any experience with them:

1 Contact your district forester of the State Conservation Department for booklets, advice on species to plant and sources for obtaining trees.

2 Beyond all doubt, greater success under proper conditions will be obtained with the so-called " old line " species. As named by the State Conservation Department, they are white pine, Scotch pine, red pine, Norway spruce, white spruce, white cedar, European larch and Japanese larch. They have all done well here as young trees.

3 To the foregoing list you can almost certainly add western yellow or ponderosa pine. Those planted at Far Fields have made a very fast growth and are of tremendous substance.

4 Another tree of almost certain success is the Austrian pine. It is beautiful although it appears to be quite slow in growth, especially on rocky ground.

5 For rapid cover, pines are preferable to spruces or firs, although larch — a conifer with annually deciduous needles — is the fastest if you can get it started.

6 Some species, such as larch, need full sunlight. Others, such as balsams, will do well in almost full shade.

7 Spacing is an important item. For instance, white pine should be planted closer than red pine because the branches of the red pine spread and close in much faster.

8 Plant more than one species, either in mixture or in rows of not less than five of a kind.

9 Direction of slope is important for some species. Some, as Douglas fir, may do better on steep north slopes; others, as ponderosa pine, on west slopes. A number of native species appear not to be particular on this point.

10 Select trees with care, considering altitude, slope, soil types, drainage, sunlight and shade.

11 Air drainage is a subject to study and should be used for some species, to avoid "frost pockets" as planting areas for plants not so rugged.

12 As soon as a shipment of trees arrives, heel them in a trench, cover roots with compacted earth, water well and keep trees shaded.

13 Do not let roots of conifers become dry prior to planting. If the sensitive roots are exposed to air for only a short time, dead trees will probably result.

14 If a shipment of trees arrives during a dry period, it is better to let them remain heeled in and water them daily until the planting site becomes moist from rain.

15 Spring planting is preferable to fall planting, especially in heavy soils.

16 Young transplants are more successful than seedlings, particularly for fall planting.

17 In general, the grub hoe has proved the all-round successful tree planting tool.

18 Keep livestock off planted areas.

19 Keep trees back 50 feet from roads. This bare belt should remain unplanted to serve as a fire protection.

20 Prevent planted land from being burned.

No one knows the conifers better than Doctor Bailey and no one can write of them more beautifully. The following excerpt from his book, The Cultivated Conifers in North America, is appropriate for Arbor Day reading:

The love of the conifers is no passing fancy. It is not subject to change in fashions. What a man plants today of the large durable species will give him joy as long as he lives, and the trees will carry his memory to his children's children; "he shall grow like a cedar in Lebanon." Urge to plant durable trees is man's desire for immortality, to establish something that will last far beyond his time.

Cows versus Trees

JOSHUA A. COPE
Department of Forestry
New York State College of Agriculture

The trees are sad where cattle browse
The smiles are all upon the cows.

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Man's faithful friend is no friend to trees

IN THAT BRIEF COUPLET, Bob Adams, Cornell's Rude Rural Rhymer, sums up the case when trees and cows are allowed to be together. Both are wonderful servants to man. In fact, without the two of them there would be no such thing as farming on much of the upland areas of the Empire State. It is easy to see how they came to be together on most of the dairy farms of the State. The trees were there first, of course, then as pioneers came, land clearing was first limited to the crop land. This area was fenced and the cows had the run of the rest of the farm and the neighboring farm and the roadside too.

This situation still exists in some of our southern states. If one desires to raise crops, stock must be fenced out. In New York, in common with all other states in the Northeast, the stock is required to be fenced *in* and not *out*. Within the boundary fence, however, there is no legal bar to the cows roaming at large. It is only as landowners are brought to see the damage the cows actually do to the woods that they will put a fence within the boundary fence that will keep the cows out of the woods as well as out of other crops.

This damage is not obvious and glaring like the damage caused by fire. It is slow, insidious, but none the less cumulative. Fire could destroy a woodlot in 50 minutes, whereas persistent grazing might take 50 years, but in the end the result is the same.

And it is not as if the cows received any substantial food value from browsing in the woods. Experiments conducted some years ago in Ohio indicated that on an exclusive diet of hardwood leaves and twigs, cows lost so much weight in a month's time that immediate change of pasturage was required to prevent the cows from starving to death. "Well," says the doubting landowner, "maybe the cows don't get much real food value out of the woods but what possible harm to the trees? Cows have been in my woods thirty years and the trees are still standing." But that really is not the point. Of course the trees are still standing. The real point is, are they growing as thriftily as they should if the cows were out? For a real appraisal of grazing damage, one needs to look down and not up.

Loss of Seedlings

Obviously there are no young trees coming on in the understory in a heavily grazed woods unless it is hemlock, which the cows do not like. If there is a dense crown canopy overhead, what difference if there are no seedlings below? Again the doubting landowner wants to be shown. The seedlings are needed in the understory, not for replacement purposes at the moment — that will come later

when the overhead canopy is broken or removed entirely. They are needed as anchors to hold the annual fall of leaves in place.

These precious leaves are Nature's own fertilizer for the growing crop of forest trees. It has been found by careful measurements that the annual fall of leaves on a well-stocked (with trees, not cows) acre of farm woodland, weighs about a ton and a half. The essential plant foods contained in this ton and a half of leaves included 16.6 pounds of nitrogen, 3.3 pounds of phosphorus, 13.5 pounds of potassium, 65.6 pounds of calcium, 9.2 pounds of magnesium — a total of 108 pounds of fertilizer dropping on each acre each year. In the grazed woodlot the strong winds of November sweep along the bare forest floor, taking the leaves with them. In the ungrazed woods the leaves are anchored and held in place securely by the thousands of seedlings which carpet the forest floor.

In addition to fertilizer from the accumulated leaf fall, there is the matter of moisture conservation. Go into an ungrazed woods on the very hottest, driest day of summer, and kick down through the spongy leaf litter. No matter how tindery the top layer, it is moist underneath. Since trees are always on a liquid diet, this item of moisture conservation is important indeed to growth and health. In the hard packed soil of the grazed woodlands water runs "*off*" more readily than "*in*."

The most striking example of the mulching and fertilizing value of leaves that ever came under the writer's observation was on the eastern shore of Maryland in the loblolly pine section. A 50-year old stand of pine was discovered, split approximately in two by a boundary fence. On one side of the fence the stand had grown untouched for the five decades. On the other side of the fence the needles had been removed each year for the last four decades, not by the wind but by the farmer. He had no straw and used the needles as bedding. The trees on both sides of the fence were of the same age, and on measurement were found to be the same as to number and diameter. In the undisturbed portion, however, the trees were uniformly ten feet higher. In tree growth, height is always an expression of soil productivity. Leaving the needles where Nature intended them to be increased the height growth a foot every five years.

There is also the matter of replacements when the overhead canopy is removed by storm or lumbering. In the grazed woods there are no young trees to take advantage of that sunlight that comes pouring down through the openings. It only stimulates a growth of briars and weeds.

Canopy, Too, Is Affected

A farmer once asked me to visit his sugar bush. "The trees are dying in the tops," said he, "and I am wondering what insect is causing the damage." After a brief inspection of the open sod-covered sugar bush, it was easy to point out the trouble. "The insect," I rather facetiously remarked, "that is causing this trouble to your beautiful big sugar maples does not have six legs — it has four legs plus two horns and a tail." The farmer was quite mystified until I explained about the liquid diet on which trees live. If there was not enough moisture to reach all that mighty crown, then the part to suffer first would be the part furthest from the water supply underground. Keep the cows in the woods long enough and every dominant tree will eventually show signs of "staghead."

Disease and Insects

There is the matter of disease, too, working at the roots while the tops are drying out. With no leaf mulch cover, the surface roots of the big trees become exposed by the constant trampling and packing effect of the grazing stock. Then the sharp hoofs knock off the protecting layer of bark, exposing the wood to spores of wood-destroying fungi.

Most of the insect enemies of the forest are working overhead in twig and bud and leaf. Surely grazing has no effect on insect population. As a matter of fact, there is a very definite and vital connection between insects and grazing. For at this point, the birds enter the picture. Many of our most important insect-eating birds, like the vireos, nest in undergrowth. If there is no undergrowth, there are no nests and the insect hordes produce and multiply in amazing geometrical progression.

Recognizing the damage done to farm woodlands by livestock, various attempts have been made by such agencies as the Agricultural Adjustment Administration to pay farmers for keeping cows out of

Courtesy of Ohio Forest Experiment Station, Wooster, Ohio

Protected By a Fence, the Woods on the Left Are Thriving

the woods — if not outright cash, then by paying the cost of posts and barbed wire for the fence. The results have been far from significant. In many instances the farmers put up the fence one year, and forgot to keep the bars in place the following years.

The Swedish people hit upon a better plan, for in that great forested country cows are also a problem in the woods. Among inalienable rights handed down from father to son for generations was one which gave the farmer the right to graze his stock in the forest of the feudal landlord. When these forests passed into the possession of the federal government as national forests, the farmers still held to their rights and privileges. They refused to accept pay for keeping the cattle out of the woods. Then the foresters had another approach. They agreed to pay for all the fertilizer needed to put the pasture in a highly productive state if the farmer would remove his cows from the woods. It worked, and farmers found to their satisfaction that they could now carry more cows on their fertilized home pasture than they could in the old days when the cows were free to roam the woodlands.

A Last Citadel of the Wilderness

PAUL A. SCHAEFER
Secretary, Moose River Committee

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Here is a land of solitude and beauty

THE MOOSE RIVER PLAINS are situated north of the West Canada lakes and south of the Fulton Chain of lakes in the southwestern portion of the Adirondack Park. They form a part of nearly a thousand square miles of almost unbroken wild land, much of it state-owned, which contains choice remnants of the original forest which once so richly covered New York State. The valley of the South branch of the Moose river bisects this region in an east-westerly direction, beginning at Little Moose lake near Cedar river flow and ending at McKeever on the Old Forge highway.

The plains are accessible from many directions, the most popular trail beginning at Limekiln lake near Inlet on the Fulton Chain and heading generally in a southeasterly direction. This trail passes Fawn lake, climbs a spur of Seventh Lake mountain and descends into the Red River valley. A short distance beyond the Red river the trail climbs Mount Tom and, entering a grand spruce forest, threads through a mountain notch and drops into the valley of the South branch of the Moose river. This is about ten miles from Limekiln lake. Crossing Benedict brook and the Sumner stream,

the trail reaches the Great Plains where long, sweeping vistas of wild open land converge with dark evergreen forests and gently sloping hills surrounding this unique plateau. Over and above the spruce and hardwoods may be seen an occasional giant pine, its storm-bent crown high above the spires of lesser conifers.

Here one is conscious of being in contact with the wilderness, or at least with those elements which combine to give some substance to that word in this day and age. There is a sense of vastness about the country, made real by knowledge of the many delightful miles already traversed and of the long, seemingly endless miles that lie before one. To the east, the graceful peak of Wakely mountain may be seen ten miles away. To the south a series of enfolding ridges, gemmed with glacial lakes and threaded with crystal streams, stretch 20 miles to the Piseco Lake highway.

The Great Plains and the Little Plains close by are an entity in themselves, even though they lack the magnificence of the adjacent country. Comprising nearly 700 acres at an elevation of about 1850 feet, they are of a sandy composition with dips and hollows 20 to 40 feet below their general mean level. Peninsulas of trees reach out from the surrounding forest and in places reach clear across the otherwise open meadows. An occasional oasis of evergreens occurs and in places these are almost impenetrable. Between the Great and the Little Plains there is a thin strip of evergreen forest. A few years ago this forest was hit by winds of hurricane velocity which tumbled trees in every direction. Here and there a giant tree stands in mute testimony to individual strength but the forest, as such, is ragged and forlorn, adding a strange wildness to the scene. Within this general area, however, are to be found two small glacial lakes of rare beauty. The smallest, Icehouse pond, is deep and cold and famous for its trout. The larger, Helldiver pond, is shallow and in its own way is very interesting.

The plains are the heart of the largest deer wintering yard in New York State. Here, in an area roughly ten miles long by from one-half to two miles wide, several thousand deer concentrate when the deep snows and cold winds of winter hold the North Country in its grip. Evergreen shelter and a variety of food draw these animals from miles around. With such a profusion of deer an abundance of other animals may also be found. The otter, the fisher, the marten, the bay lynx as well as the bear, beaver, fox, mink and other small animals are all at home in this region. Bird life is equally abundant.

Evidence of man is not easily discernible. Evidence of an unbridled and untamed nature is everywhere. A tranquillity and a stillness seem to hold the land in a spell. There is the melody of the river, to be sure, as well as the drumming of a partridge and the rasping of insects. Often one hears the dull thud of pointed hoofs and the crackling of twigs as deer bound off across the meadow into the shadows of the woods. These sounds but emphasize the solitude of the region.

Happily the plains are but the threshold to a rare combination of forests and mountains in the surrounding country.

Close by, due north, are the Mitchell ponds. To the northeast are the Lost ponds, which nestle in a pine forest near the Sumner stillwater. To the east are many miles of fine trail leading out along the old Moose River trail to Little Moose lake near Cedar River flow. The West Canada lakes are about eight miles to the south. Southwest are Beaver and Squaw lakes in the magnificent Indian River country.

Photograph by Paul A. Schaefer

Icehouse Pond, Moose River Plains

The trail to the Indian River region is one not easily forgotten. Proceeding on the main trail leading across the western end of the plains, it crosses the South branch of the Moose and climbs a heavily forested ridge. Here one comes in close contact with huge white pines, some of them four feet and more in diameter and 150 feet tall. Although interspersed rather infrequently among the dominating spruces, hemlocks and hardwoods, these pines are the feature and the glory of this part of the State Forest Preserve.

Slightly less than two miles from the plains the trail drops rather sharply to Beaver lake. Its shoreline is notable, with an unbroken wall of pines, spruce and tamarack sharply defining its pelt-like shape. Its east end has a shallow sandy beach which is a favorite spot for deer and other animals during the summer months.

Beyond Beaver lake the best trails are made by woodfolk. One of these skirts along the northern shore to the outlet and leads on down the valley to the Indian river, which is less than a mile farther on.

There probably are regions equally fascinating elsewhere in the Adirondacks. It is doubtful, however, if the qualities of primitive beauty as existing in this area can be surpassed anywhere in the East. The type of scenery can not be compared with Avalanche pass, for example, for it is totally different in character. But it does have, in its own way, inspirational qualities generally associated only with such stupendous scenes as are found in the Avalanche or the Indian passes in the high peak region.

One walks beneath the great pines on the bluff above the river with reverence. The forest floor is rich with the undis-

turbed duff of the centuries. In the deep shade of the venerable trees are countless seedlings struggling for a place in the sun. Ferns and mosses and flowers of the wilderness add color and interest to the wild forest scene. Occasionally one comes upon a great lone pine, stark and dead, but the ranks of the living are so full and the virility of Nature so great that these are viewed as a desirable chapter in the centuries-long cycle of the forest. Soon such a giant must fall, and mosses and lichens will speed its return to the soil from which the forest, generations hence, will be nourished.

To follow the river upstream is to find increasingly beautiful vistas slowly unfolding. For perhaps a mile the river is a series of riffle and rapid, with occasional pools suggesting the certainty of trout. The climax of the Indian river is reached perhaps a mile and a quarter from the Moose river.

Here one looks upon a long silver stillwater. The forest is canyonlike in aspect, with spruces and balsams rising clifflike above the water and occasional giant pines dominating it all. The banks are lush with ferns and mosses and waist-high grasses. Well-worn deer paths skirt the water's edge. The river is deep here and the banks pitch off sharply.

It is a land of solitude and of antiquity. It is as an open book, in which the Adirondacks of 1850 or 1750 or 1650 may be examined at will and with leisure. It is, as it were, the Primitive Wing of an unchartered Museum of America, in which the background and the details have been arranged by Nature, nor have they been rearranged by man. In this vast theater of the out-of-doors one may view a remnant of original America in all her moods and subtle changes. Here, according to day and season, one may watch a steady rain being absorbed in spongelike duff, to be released later in tiny springs and crystal streams which ultimately make the river. Here one can watch a great antlered buck come out of the evergreens to drink of the river, or possibly see a black bear lumber down a well-worn trail. Here also will be seen native trout jumping for flies, or a great blue heron standing statuelike on a shallow sand bar. And the deepening shadows of today's twilight will gently erase the same galaxy of color and beauty of form as in another age long since past and almost forgotten.

This is the Moose River region. In a lifetime a man could not fully know or understand its labyrinth of trails, streams, swamps, waters and mountains. It is a land much too big for that. It is a land that challenges exploration and invites study.

To preserve this land in its natural wild state is to bequeath to the youth of tomorrow a heritage of incalculable value; for the combination of forests, waters and wildlife as presently contained in this Moose River region is a combination that is vanishing swiftly from America.